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A NEW SPECIES OF *DISTATRIX* (HYMENOPTERA: BRACONIDAE) FROM CALIFORNIA, WITH BIOLOGICAL NOTES

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Abstract.—The first recorded species of *Distatrix* Mason from North America, ***D. solanae*** Whitfield, n. sp., is described from specimens reared in California from larvae of three species of geometrid moths. Biological information, and diagnostic characters distinguishing the new species from the other described species of *Distatrix,* are provided.

Key Words: Description, parasitoid, Lepidoptera, chaparral, oak woodland

An unusual, partly xanthic, species of microgastrine braconid wasp with enlarged eyes was reared by the junior author that appears unlike anything previously recorded in the Nearctic Region. The species belongs to the genus *Distatrix* Mason, which has no described species previously recorded in North America (Whitfield, 1995), although one described species has been recorded from southern Mexico. The genus will key with some difficulty to *Glyptapanteles* or *Venanides* in Marsh et al. (1987) but will not match the illustrations provided there.

The genus *Distatrix* was erected by Mason (1981) to include those species of *Apanteles* Foerster placed by Nixon (1965) in his *formosus* - group. The genus is relatively small, with less than 15 described species worldwide, most of which are found in the Old World. The New World species have never been revised. The new species shares with the other described species of *Distratrix* a number of features, including: absence of the upper pronotal groove; vannal lobe of hindwing subapically straight to concave, with reduced fringe of hairs; ovipositor sheaths with reduced, minute apical hairs, and the more or less triangular form of the second metasomal tergum. In addition, it shares with the European *D. formosus* (Wesmael) the habit of making unusual (for microgastrines) pedunculate (stalked) cocoons attached to the host plant of its geometrid host caterpillar.

Below we provide several biological details on the new species, and the senior author provides a description of its morphology. Terminology follows Mason (1981) for body structures, and Sharkey (1994) for wing veins.

Specimens of *Distatrix solanae* n. sp. were collected in three communities in California and Oregon during a survey of caterpillars and their parasitoids. Most *D. solanae* were collected in a chaparral and oak woodland community in the Vaca Mountains of California's inner Coast Range. At this site more than 7000 macrolepidopteran caterpillars (103 species in 10 families) were collected from the twelve most common trees and shrubs. The only host of *D. solanae* in the Vaca Mountains was *Prochoerodes truxaliata* (Guenee) (Geometridae), collected on *Baccharis pilularis* de Candolle. This geometrid is a specialist on

Baccharis (Ehler et al. 1990). Seventy-five second and third instar caterpillars (<20 mm) produced fourteen parasitoid pupae and twelve adults. More than 4000 additional caterpillars of various species were also collected from other chaparral and oak woodland sites where *Baccharis* or *P. truxaliata* are known to occur. However, it is unknown whether *D. solanae* occurred at these sites since *P. truxaliata* caterpillars were not collected.

The other two communities where *D. solanae* was collected were sampled less intensively. Three *D. solanae* were collected on the west slope of the Oregon Cascade Mountains on *Alnus sinuata* (Regal) Rydb., at a site dominated by *Tsuga heterophylla* (Ref.) Sarg. and *Pseudotsuga menziesii* (Mirbel) in the H. J. Andrews Experimental Forest. The parasitoids emerged from two *Elpiste lorquinaria* (Guenee) and an unidentified species in the Noctuidae. A single *D. solanae* was also found in the western Sierra Nevada Mountains of California at a site dominated by *Pinus ponderosa* Dougl. The parasitoid emerged from one of the two *Eupithecia* sp. (Geometridae) specimens collected on *Calocedrus decurrens* (Torr.) Florin. This host is from the *palpata* (Packard) species group (D. C. Ferguson, pers. comm.) but is not currently placeable to species.

Overall, *D. solanae* is a generalist, yet it is possible that populations are locally specialized on different host plants. The site with the strongest support for local specialization is the Vaca Mountains where *D. solanae* has either a strong preference for *P. truxaliata* or its host plant, *Baccharis*. *Baccharis* was one of the least abundant plants that was surveyed in the Vaca Mountains (Scaccia, unpublished data), yet 18.7 percent of the *Baccharis* specialist, *P. truxaliata,* were parasitized. Alternatively, the apparent host specialization of the Vaca Mountains population may be an artifact of sampling. More extensive sampling may reveal that species absent or under-represented in this survey are hosts of *D. solanae.*

Distatrix solanae probably attacks early instar caterpillars. Hosts ranged from 9–20 mm in length at collection. This length corresponds with second through late third instars for *P. truxaliata.* This size range may include final instar *Eupethicia lorquinaria* or *E.* sp. However, only *P. truxaliata* caterpillars were closely examined to determine the host stage at collection and parasitoid pupation.

The head capsules of several *P. truxaliata* caterpillars were saved after each molt. Head capsules of parasitized caterpillars were compared with unparasitized caterpillars to determine the instar at collection and parasitoid pupation. Head-capsule widths ranged from 1.41 to 1.58 mm for third instar caterpillars. This variation was greater than previously shown (Ehler et al. 1990) and may be due to differences in food quality, temperature, or sites.

Parasitoids emerged and pupated when host *P. truxaliata* caterpillars were in their third and fourth instars (possibly the final instar for *Elpiste* and *Eupithecia*). Eighty-three percent of the parasitoids from February and March collections emerged from fourth instar *P. truxaliata,* whereas seventy-five percent of the June parasitoids emerged from third instars. Parasitoid larvae typically emerged dorsolaterally from either side of the caterpillar, slightly anterior to the fifth abdominal spiracle. One parasitoid exited between the host's dorsal setae. Parasitoids spun their cocoons on stems or other host plant material (Fig. 4). Caterpillars were usually found moribund on the bottom of rearing containers when parasitoid pupation occurred. The pupal period lasted from eight to sixteen days depending on season. Two thirds of the adults were females.

Distatrix solanae is apparently multivoltine. In the Vaca Mountains, parasitized caterpillars were collected in February, March, June and July 1992. Adult *P. truxaliata* have also been collected in other months (J. DeBenedictis, personal communication). It is likely that *D. solanae* will also occur dur-

ing these other periods since none of the pupae underwent diapause.

Distatrix solanae Whitfield, New Species
(Figs. 1–5)

Holotype female.—Body length 3.2 mm; forewing length 3.6 mm.

Head (Fig. 3): Black except honey-orange palpi, scapes, pedicels, labrum, mandibles, palpi, and dark brown flagellomeres. Frons medially taller than broad due to size of eyes, weakly punctate; inner margins of eyes very weakly converging towards clypeus before diverging ventrally. Eyes extremely large, forming most of visible portions of head in lateral view (Fig. 3). Antennae slightly longer than forewing and tapering gradually; all but distal flagellomeres with 2 ranks of placodes; flagellomere 2 3.7× as long as broad; flagellomere 14 3.8× as long as broad.

Mesosoma: Honey-orange except darker regions around extreme ventral and dorsal portions of mesopleuron and anterodorsal corner of metapleuron, lateral regions of metanotum, and central portion of propodeum. Pronotum with dorsal groove essentially obliterated. Mesoscutum evenly, sparsely and shallowly punctate, less distinctly so posteriorly; surface otherwise rather polished; width just anterior to tegulae just barely less than that of head. Scutoscutellar scrobe composed of an indeterminate number of confluent crenulations, weakly arched medially. Scutellar disc slightly longer than anteriorly broad, distinctly but shallowly punctate. Metanotum weakly and evenly retracted from scutellum; sublateral setiferous lobes not developed. Propodeum (Fig. 1) mostly weakly punctate to smooth, evenly convex medially, with short superimposed ridges posteriorly, radiating from nucha.

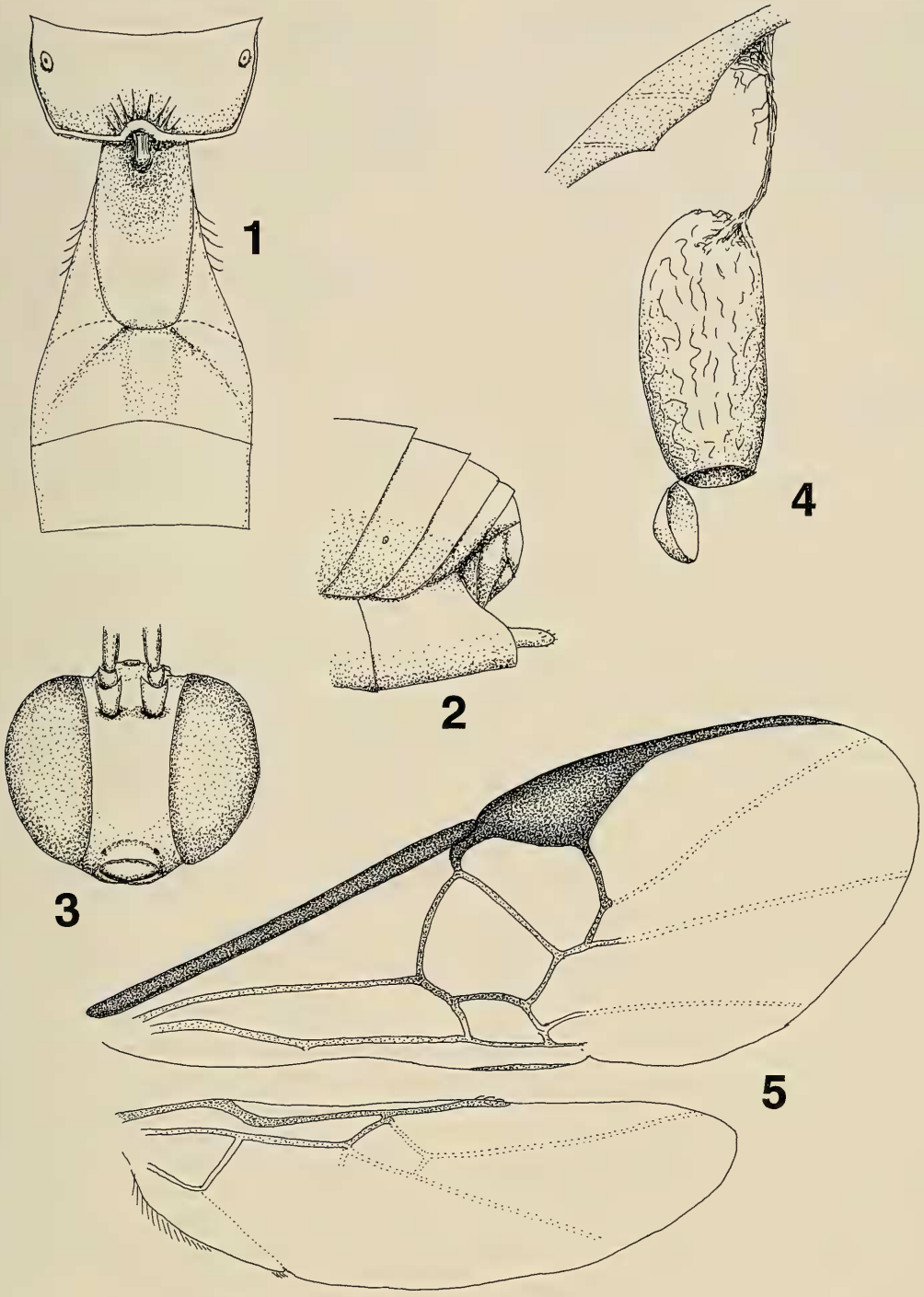
Legs: Pale honey-orange except distal tarsomeres (pro- and mesothoracic legs) and apices of femora and tibiae and most of tarsi (metathoracic legs). Hind coxae long, extending to just beyond posterior margin of third metasomal tergum. 25-30 spines on outer faces of hind tibiae, subequal in length with normal setae but thicker and pale golden. Inner apical spurs of hind tibiae 1.2× as long as outer, about 0.7× length of hind basitarsus.

Wings (Fig. 5): Hyaline, proximal venation of forewing even brownish, distal venation and stigma more darkly pigmented. Tegulae honey-orange. 2r of forewing weakly arched, somewhat longer than 2 + 3RS, meeting it at distinct but not acute angle marked by a knob. R1 1.1× as long as stigma, approximately 4× as long as distance from its distal end to end of 4RSb fold along wing edge. Stigma about 2× as long as broad, evenly pigmented (but pale at extreme base in some specimens). Hindwing with vannal lobe flattened subapically, with reduced fringe over flattened portion.

Metasoma (Figs. 1, 2): Honey-orange except darkened posterodorsal tip (medial regions of posterior terga), slightly darkened portions of hypopygium and nearly black ovipositor sheaths. Tergite I very weakly sculptured, 1.9× as long as broad at broadest point, subparallel-sided to narrowing posteriorly then rounding at posterior end, with broad excavation medially over anterior half; moderately arched in profile. Tergite II also weakly sculptured, subtriangular, 2.0× broader posteriorly than maximum length, shortest medially, with weakly concave posterior margin; surface raised medially; lateral margins of main tergite weakly defined. Tergite III and posterior terga of normal, unsculptured, overlapping form. Hypopygium (Fig. 2) relatively short, evenly sclerotized, truncate at tip. Ovipositor sheaths short and evenly tapering towards blunt tip, armed with sparse tiny setae at extreme apex. Ovipositor short, weakly decurved.

Males.—Mesosoma and metasoma mostly blackish, antennae more clearly longer than forewing. Eyes of more normal microgastrine proportions, with genae and postgenae clearly visible in lateral view.

Variation.—Some degree of variation (apart from the sexual dimorphism already



Figs. 1–5. *Distatrix solanae,* n. sp. 1, Dorsal view of propodeum and anterior three terga of metasoma. 2, Lateral view of apex of female metasoma. 3, Anterior view of female head. 4, Cocoon. 5, Wings.

noted) exists in the available series in the size of the darkened regions of the meso- and metasoma, sometimes extending to nearly all of of the mesopleuron, metanotum, metapleuron and propodeum. Body length 3.4–3.9 mm (females tend towards larger end of range). Forewing length 3.9–4.4 mm.

Cocoons (Fig. 4).—Brownish tan, rather tough, surface rather coarsely woven and attached by an asymmetrical silken stalk at one end to a host plant stem, leaf, or other substrate.

Material examined.—Holotype female: CALIFORNIA: Napa Co., 13 mi. W. Winters, 18-VI-1992, B. Scaccia, Bacc (92)228, pup. 17-VII-1992, em. 27-VII-1992, ex *Baccharis pilularis* DC (Univ. California, Davis). Paratypes: 1 female, similar data except emergence and pupation dates (JBW collection); 2 females, similar data but 12 mi. W. Winters, 17-II-1992 (Univ. California, Davis); 1 female, similar data but 14 mi. W. Winters, 8-III-1992 (Univ. California, Davis); 1 female, 1 male, Solano Co., Stebbins-Cold Canyon Reserve, 10 mi. W. Winters, 6-VII-1992, B. Scaccia (lot numbers and emergence dates vary) (B. Scaccia collection, Univ. California, Davis); 1 male, 1 female, similar data but 8-II-1992 (JBW collection); 1 male, similar data but 11-III-1992 (Univ. California, Davis). Holotype and paratype deposition locations listed after specimens; all specimens originally from B. Scaccia collection.

Hosts.—Three of the four hosts have been determined, all in the Geometridae. They are *Prochoerodes truxaliata* (Guenee) on *Baccharis pliularis* D. C., *Elpiste lorquinaria* (Guenee) on *Alnus sinuata* (Regal) Rydb., and *Eupithecia* sp. on *Calocedrus decurrens* (Torr.) Florin.

Comments.—This species most closely resembles *Distatrix teapae* (Nixon), both in morphology and coloration, sharing with it and *D. belliger* (Wilkinson) the enlarged eyes (females only at least in *D. solanae*). With *D. teapae* and at least two other *Distatrix* spp., *D. maia* (Nixon) and *D. formosus* (Wesmael) (but not *D. belliger*), it shares a modified distal front tarsomere, which is excavated apically on the ventral side and bears a strong curved spine over this excavation.

The new species differs from *D. teapae,* in having 2r of the forewing conspicuously longer than 2 + 3RS and meeting it at a distinct angle (often armed with a small knob), whereas in *D. teapae* 2r is usually shorter than 2 + 3RS and meets it in a gentle curve. In addition, the hypopygium of the new species (Fig. 2) appears more truncate apically than that of *D. teapae,* the mesonotum tends to be conspicuously longer than broad (in *D. teapae* the width and length are more or less equal) and the head tends to be smaller in comparison with the mesosoma. In general the dark brown areas of the body tend to be more extensive in the new species, but this is quite variable and might be geographically highly variable in both species. The confinement of the enlarged eyes to females is curious; that and the partly xanthic coloration would suggest that host searching may be nocturnal. Palmer and Tilden (1987) found that first instar *P. truxaliata* feed day and night, whereas later instars are nocturnally active. All caterpillar samples from which this parasitoid species emerged were collected at dusk, consistent with a crepuscular to nocturnal host searching period for *D. solanae.*

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